

**Results of Electronic Ballot of RESNET Board of Directors on
Authorizing the RESNET Technical Committee's Proposed
Changes to the Lighting, Appliances and Miscellaneous
Energy Usage Profiles to the RESNET Public Review and
Comment Process
February 3, 2011**

Shall the RESNET Board of Directors authorize the RESNET Technical Committee proposed changes to the Lighting, Appliances and Miscellaneous Energy Usage Profiles amendment (Attachment A) to the RESNET public review and comment process?

Yes (18)

No (0)

Abstain (0)

Not Voting (1)

Ben Adams
Dave Bell
Steve Byers
Dennis Creech
Lance DeLaura
Brett Dillon
Charles Eley
Philip Fairey
David Goldstein
Andy Gordon
Mark Jansen
Lee O'Neal
Bill Prindle
Javier Ruiz
Eurihea Speciale
Orlo Stitt
Daran Wastchak
Barb Yankie

Greg Thomas

The RESNET Board authorized the submitting the proposed amendment to the RESNET public review and comment process.

Attachment A

Substantive Changes to:

RESNET Standard Amendment 01-10, “Lighting Appliances and Miscellaneous Energy Usage Profiles” as a result of Public Comment.

The following sustentative changes to the subject Proposed RESNET Standard Amendment are submitted for a second round of public comment:

1) Modify Table 303.4.1.7.2.5(2) as follows:

Table 303.4.1.7.2.5(2) Age-based Vintage Ratios

Refrigerator Vintage	Vintage Ratio
1972 or before	2.50
1980	1.82
1984	1.64
1988	1.39
1990	1.30
1993 forward	1.00
2001 forward	0.77

Justification: National refrigerator standards were updated in 2001 changing the minimum standards for manufacturers. An analysis of the impact of the 2001 refrigerator standards as compared with the 1993 refrigerator standards shows that the 2001 standards result in refrigerators that are approximately 23% more efficient than the 1993 standard.¹ This proposed change allows the 2001 refrigerator standard to be properly represented in this proposed amendment to the RESNET standards.

2) Add new Table 303.4.1.7.2.5(3) as follows:

For the purposes of determining Adjusted Volume (AV), the following defaults may be used:

Table 303.4.1.7.2.5(3) Default Adjusted Volume Equations

<u>Model Type</u>	<u>Default Equation</u>
<u>Unknown types</u>	<u>AV = 1.20 * nominal volume</u>
<u>Bottom Freezer</u>	<u>AV = 1.19 * nominal volume</u>
<u>Top Freezer</u>	<u>AV = 1.16 * nominal volume</u>
<u>Side by Side</u>	<u>AV = 1.24 * nominal volume</u>
<u>Single door refrigerator/freezer</u>	<u>AV = 1.01 * nominal volume</u>
<u>Single door refrigerator only</u>	<u>AV = 1.00 * nominal volume</u>
<u>Freezer only</u>	<u>AV = 1.73 * nominal volume</u>

¹ Personal communication, e-mail from Bruce Harley to Philip Fairey, December 21, 2010, Subject: Refrigerators.

Justification: Vintage refrigerators and freezers are unlikely to have available label information providing the separate volumetric capacities of the refrigerator and freezer compartments. This proposed change provides a mechanism that allows raters to determine a default Adjusted Volume for such vintage refrigerators and freezers. The table values are based on regression analysis of EPA's refrigerator and freezer data, which show good correlation between the available data and the default equation coefficients.²

3) Modify Equations 14a and 14b as follows:

$$\text{kWh/yr} = [(86.3 + 47.73/\text{EF})/215] * \text{dWcpy} \quad (\text{Eq. 14a})$$

where:

EF = Labeled dishwasher energy factor

or

$$\text{EF} = 215 / (\text{labeled kWh/year})$$

$$\text{dWcpy} = (88.4 + 34.9 * \text{Nbr}) * 12 / \text{dWcap}$$

where:

dWcap = Dishwasher place setting capacity; Default = 12 settings for standard sized dishwashers and 68 place settings for compact dishwashers

And the change (Δ) in daily hot water use (GPD – gallons per day) for dishwashers shall be calculated as follows:³

$$\Delta \text{GPD}_{\text{DW}} = [(88.4 + 34.9 * \text{Nbr}) * 8.16 - (88.4 + 34.9 * \text{Nbr}) * 12 / \text{dWcap} * (18.5 - 28.5 * \text{EF} + 12.5 * \text{EF}^2 - 4.6415 * (1/\text{EF}) - 1.9295)] / 365 \quad (\text{Eq. 14b})$$

Justification: Public comment on the proposed amendment expressed concern that, effective January 1, 2010, the federal minimum standards for dishwashers changed from a required maximum dishwasher Energy Factor (EF) to a requirement that annual energy and water use per cycle be kept below given maximums for standard and compact dishwashers. The federal standards still (10 CFR 430.23) provide for the standard calculation of dishwasher EF as equal to the cycles per kWh for the dishwasher. The standards also specify that the standard dishwasher cycles per year shall be 215. Thus, the calculation of dishwasher EF from the annual dishwasher energy use becomes 215/(labeled kWh/year). This proposed change to the amendment inserts this equation as a definition of dishwasher EF where it may not be available on labels following January 2010.

Additionally, equation 14b from this section of the amendment has been revised to correspond with the water use per cycle equation used in the DOE Life Cycle Cost Analysis⁴ that underpins the latest revision to the federal dishwasher standard. The equation terms which are stricken in favor of the revised terms are also flawed by the fact that they were developed from dishwasher EFs less than unity. Once EF exceeds unity, the EF² term in the stricken equation causes water

² Personal communication, e-mail from Bruce Harley to Philip Fairey, December 3, 2010, Subject: Refrigerator Adjusted Volume

³ http://www1.eere.energy.gov/buildings/appliance_standards/residential/docs/lcc_dishwasher.xls

⁴ Based on AHAM data showing historical relationship between total energy use (kWh/cycle) and total water use (gal/cycle)

*use to increase rather than decrease, making the stricken terms much less accurate than the revised terms.*⁵

⁵ http://www1.eere.energy.gov/buildings/appliance_standards/residential/dishwashers.html